

CLAIMS

1. An optical semiconductor device comprising:
 - an optical semiconductor element;
 - a first conductor line connected to one electrode of a pair of electrodes of the optical semiconductor element, and supplying an electric signal to the optical semiconductor element;
 - a second conductor line connected to the other electrode of the pair of electrodes of the optical semiconductor element, and supplying an electric signal to the optical semiconductor element;
- 10 a first inductance element connected to the one electrode of the optical semiconductor element and the first conductor line; and a second inductance element connected to the other electrode of the optical semiconductor element and the second conductor line, wherein
- 15 the first and the second conductor lines constitute a pair of differential lines.

2. The optical semiconductor device according to claim 1, further comprising a pair of matching resistors connected to the one electrode and the other electrode of the optical semiconductor element, respectively, and introducing the electric signals to the optical semiconductor element.
3. The optical semiconductor device according to claim 2, 25 comprising:

a first bias circuit including the first inductance element and a first resistor connected in parallel to the first inductance element; and
a second bias circuit including the second inductance element and a second resistor connected in parallel to the second inductance
5 element.

4. The optical semiconductor device according to claim 1,
comprising:
a first bias circuit including the first inductance element and a
10 first resistor connected in parallel to the first inductance element; and
a second bias circuit including the second inductance element and a second resistor connected in parallel to the second inductance
element.

15 5. The optical semiconductor device according to claim 1,
comprising a filter that cuts off frequencies higher than at least a maximum repetition frequency of a digital signal, the filter provided between the first and the second conductor lines and the pair of matching resistors.

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6. The optical semiconductor device according to claim 5, wherein the filter includes a first conductor finger section and a second conductor finger section in which a plurality of conductors crossing the first and the second conductor lines are formed, respectively, to have a
25 comb shape, the first conductor finger section and the second

conductor finger sections being alternately arranged.

7. The optical semiconductor device according to claim 6, comprising:

5 a package containing therein the first and the second conductor lines;

a lens that condenses a light emitted from the optical semiconductor element; and

an optical fiber holding member that holds an optical fiber.

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8. The optical semiconductor device according to claim 7, wherein the first and the second inductance elements are air-cored coils.

9. The optical semiconductor device according to claim 8, wherein 15 the optical semiconductor element is a semiconductor laser diode.

10. The optical semiconductor device according to claim 1, comprising:

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a package containing therein the first and the second conductor lines;

a lens that condenses a light emitted from the optical semiconductor element; and

an optical fiber holding member that holds an optical fiber.

25 11. The optical semiconductor device according to claim 1, wherein

the first and the second inductance elements are air-cored coils.

12. The optical semiconductor device according to claim 1, wherein the optical semiconductor element is a semiconductor laser diode.

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13. The optical semiconductor device according to claim 1, wherein impedances of at least two bias circuits are set asymmetric.

14. An optical semiconductor device comprising:

10 an optical semiconductor element;

a first differential input terminal supplying an electric signal to one of a pair of electrodes of the optical semiconductor element;

a second differential input terminal supplying an electric signal opposite in phase to the electric signal supplied by the first differential input terminal, to the other electrode of the pair of electrodes of the 15 optical semiconductor element;

a first inductance element connected to the one electrode of the optical semiconductor element and the first conductor line, and cutting off the electric signal at a high frequency; and

20 a second inductance element connected to the other electrode of the optical semiconductor element and the second conductor line, and cutting off the electric signal at a high frequency.

15. An optical semiconductor device comprising:

25 an optical semiconductor element;

a pair of differential amplifiers each having one terminal and the other terminal connected to one electrode and the other electrode of a pair of electrodes of the optical semiconductor element, respectively, and each supplying an electric signal to the optical semiconductor

5 element;

a first inductance element connected to the one electrode of the optical semiconductor element, and cutting off the electric signal at a high frequency; and

a second inductance element connected to the other electrode

10 of the optical semiconductor element, and cutting off the electric signal at a high frequency.

16. An optical semiconductor device comprising:

an optical semiconductor element;

15 first and second conductor lines connected to a pair of electrodes of the optical semiconductor element, and supplying differential signals to the optical semiconductor element, respectively;

a first terminal electrically connected to the first conductor line and one electrode of the pair of electrodes of the optical semiconductor

20 element; and

a second terminal electrically connected to the second conductor line and the other electrode of the optical semiconductor element, wherein

the first and the second terminals are connected to bias circuits

25 that cut off high frequencies, respectively.

17. An optical semiconductor device comprising:
 - an optical semiconductor element;
 - a first conductor line having one end connected to one of a pair
- 5 of electrodes of the optical semiconductor element, and supplying an electric signal to the optical semiconductor element;
 - a second conductor line having one end connected to the other electrode of the pair of electrodes of the optical semiconductor element, and supplying an electric signal to the optical semiconductor element;
- 10 a first inductance element connected to the one electrode of the optical semiconductor element and the first conductor line; and
- 15 a second inductance element connected to the other electrode of the optical semiconductor element and the second conductor line,

wherein
- the optical semiconductor element is driven by a push-pull operation.

18. The optical semiconductor device according to claim 17, wherein impedances of at least two bias circuits are set asymmetric.